TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TSC136

High Voltage NPN Transistor

TO-220

Pin Definition:
1. Base
2. Collector
3. Emitter

PRODUCT SUMMARY

BV_{CEO}	400V
BV_{CBO}	700V
I_C	3A
$V_{CE(SAT)}$	2V @ I_C / I_B = 2A / 0.5A

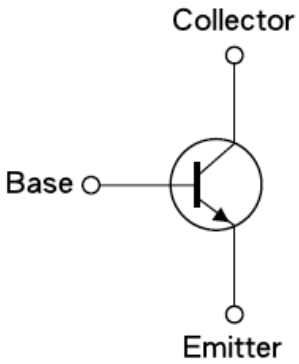
Features

- High Voltage
- High Speed Switching

Structure

- Silicon Triple Diffused Type
- NPN Silicon Transistor

Block Diagram



Ordering Information

Part No.	Package	Packing
TSC136CZ C0	TO-220	50pcs / Tube

Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CBO}	700	V
Collector-Emitter Voltage	V_{CEO}	400	V
Emitter-Base Voltage	V_{EBO}	9	V
Total Dissipation @ Tc ≤ 25°C	P_{tot}	60	W
Collector Peak Current (tp <5ms)	I_{CM}	6	A
Collector Current	I_C	3	A
Base Peak Current (tp <5ms)	I_{BM}	3	A
Base Current	I_B	1.5	A
Maximum Operating Junction Temperature	T_J	+150	°C
Storage Temperature Range	T_{STG}	-65 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Junction to Case Thermal Resistance	$R\Theta_{JC}$	2.08	°C/W

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Electrical Specifications

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Collector-Base Voltage	I_C = 10mA, I_B = 0	BV_{CBO}	700	--	--	V
Collector-Emitter Breakdown Voltage[a]	I_C = 10mA, I_E = 0	BV_{CEO}	400	--	--	V
Emitter-Base Breakdown Voltage	I_E = 1mA, I_C = 0	BV_{EBO}	9	--	--	V
Collector Cutoff Current	V_{CB} = 700V, I_E = 0	I_{CBO}	--	--	100	uA
Emitter Cutoff Current	V_{EB} = 9V, I_C = 0	I_{EBO}	--	--	10	uA
Collector-Emitter Saturation Voltage[a]	I_C =0.5A, I_B =0.1A	$V_{CE(SAT)1}$	--	--	0.5	V
	I_C =0.6A, I_B =60mA	$V_{CE(SAT)2}$	--	--	0.7	
	I_C =2A, I_B =0.5A	$V_{CE(SAT)3}$	--	1.5	2	
DC Current Gain	V_{CE} = 5V, I_C = 10mA	h_{FE} 1	10	27	--	
	V_{CE} = 5V, I_C = 1A	h_{FE} 2	10	--	30	
	V_{CE} = 5V, I_C = 2A	h_{FE} 3	4	--	24	
Frequency	V_{CE} = 10V, I_C = 0.1A	f_T	4	--	--	MHz
Output Capacitance	V_{CB} = 10V, f = 0.1MHz	Cob	--	21	--	pF
Turn On Time	V_{CC} = 125V, I_C = 1A, I_{B1} = 0.2A, I_{B2} = 0.2A, R_L = 125ohm	t_{ON}	--	0.4	--	uS
Storage Time		t_{STG}	--	2.0	--	uS
Fall Time		t_f	--	0.16	--	uS

Notes:
a. Pulsed duration = 300uS, duty cycle ≤1.5%

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Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

Figure 1. Static Characteristics

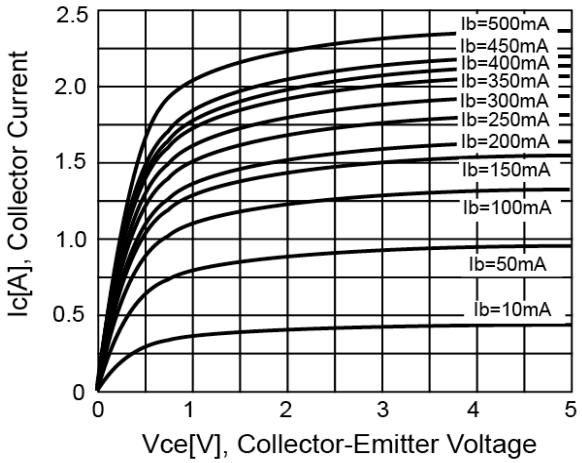


Figure 2. DC Current Gain

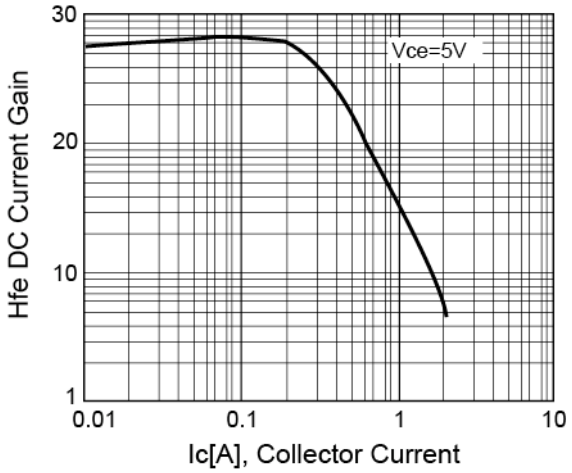


Figure 3. Vce(sat) v.s. Vbe(sat)

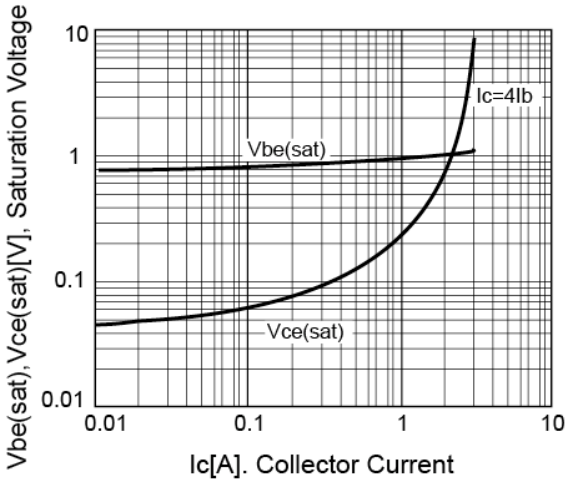


Figure 4. Power Derating

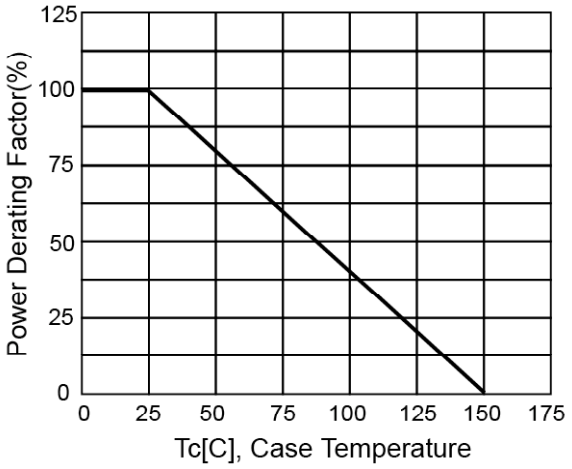


Figure 5. Reverse Bias SOA

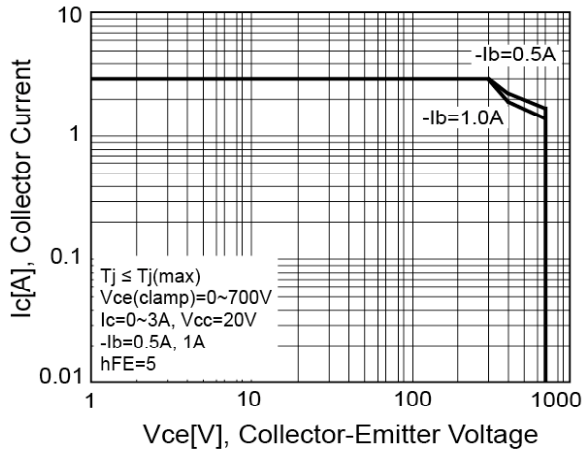
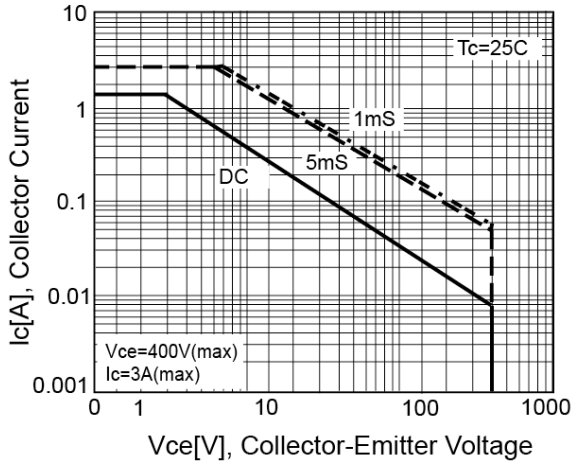


Figure 6. Safety Operating Area



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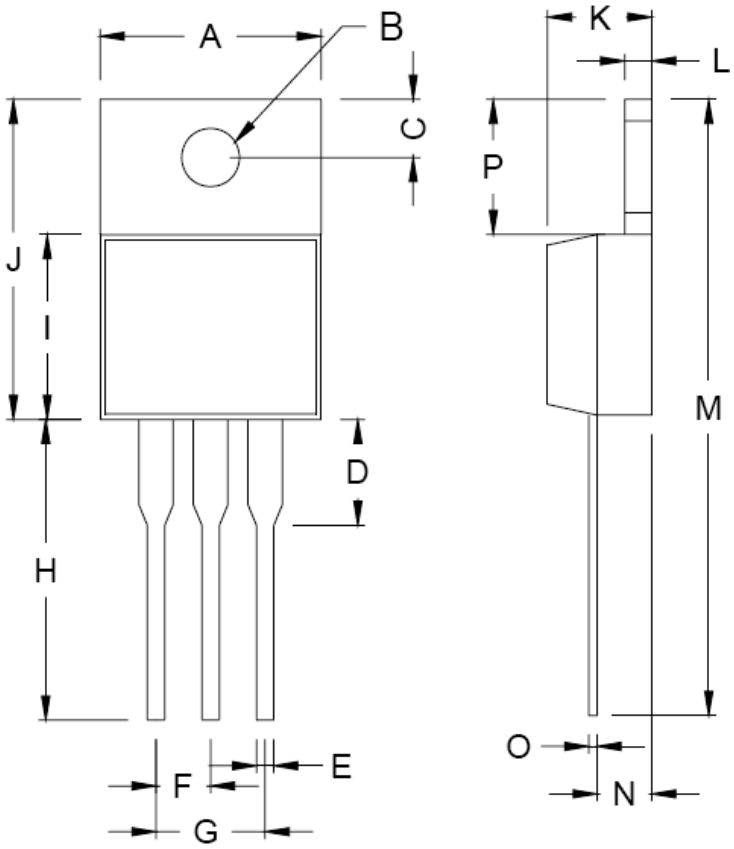
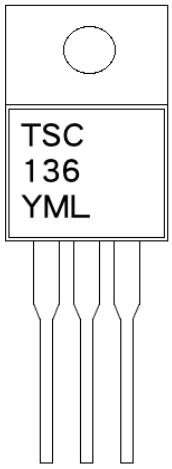
TO-220 Mechanical Drawing



TO-220 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.000	10.500	0.394	0.413
B	3.740	3.910	0.147	0.154
C	2.440	2.940	0.096	0.116
D	-	6.350	-	0.250
E	0.75	0.85	0.029	0.033
F	2.345	2.715	0.092	0.058
G	4.690	5.430	0.092	0.107
H	12.700	14.732	0.500	0.581
J	14.224	16.510	0.560	0.650
K	3.556	4.826	0.140	0.190
L	1.285	1.315	0.050	0.051
M	27.700	29.620	1.060	1.230
N	2.032	2.921	0.080	0.115
O	0.255	0.610	0.010	0.024
P	5.842	6.858	0.230	0.270

Marking Diagram



Y = Year Code
M = Month Code
(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apl, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)
L = Lot Code

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